
टिन पाउडर — विशिष्टि
(दूसरा पुनरीक्षण)

Tin Powder — Specification
(Second Revision)

ICS 77.160

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FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Powder Metallurgical Materials and Products Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1977 and subsequently revised in 1993. This revision has been brought out to bring the standard in the latest style and format of the Indian Standards. It also incorporates amendment 1 issued to the last version of the standard.

This standard contains **6.2**, **7.2** and **10** which call for agreement between the purchaser and the manufacturer.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be same as that of the specified value in this standard.

*Indian Standard***TIN POWDER — SPECIFICATION***(Second Revision)***1 SCOPE**

This standard covers the requirements for granular tin powders for powder metallurgical applications.

2 REFERENCES

The standards listed in Annex A contain provisions, which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards.

3 TERMINOLOGY

For the purpose of this standard, definitions as given in IS 5432 shall apply.

4 SUPPLY OF MATERIAL

General requirements relating to the supply of tin powder shall be laid down in IS 1387.

5 MANUFACTURE

Tin powder may be manufactured from ingots conforming to IS 26.

6 GRADES

6.1 There shall be four grades and maximum particle size for each grade when determined in accordance with IS 5461 shall be as follows:

Grade A	180 micron
Grade B	125 micron
Grade C	90 micron
Grade D	75 micron

6.2 The requirements of particle size other than specified above shall be subject to mutual agreement between the purchaser and the manufacturer.

7 CHEMICAL COMPOSITION

7.1 The chemical composition of the tin powder shall be as given in Table 1.

7.2 The chemical analysis of tin powder shall be carried out by the methods specified in IS 1940 or any other established instrumental/chemical method. In case of dispute, the test method specified

in IS 1940 shall be the referee method. However, where the method is not given in IS 1940, the referee method shall be agreed to between the purchaser and the manufacturer.

7.3 Hydrogen loss shall be determined in accordance with IS 5644 (Part 2).

Table 1 Chemical Composition of Tin Powder*(Clause 7.1)*

Sl No.	Constituent	Weight Percent
(1)	(2)	(3)
i)	Tin	99.00, <i>Min</i>
ii)	Lead	0.10
iii)	Antimony	0.04
iv)	Copper	0.05
v)	Bismuth	0.04
vi)	Iron	0.02
vii)	Arsenic	0.04
viii)	Other impurities	0.05
ix)	Hydrogen loss	0.60

NOTE — The composition limits indicated are expressed as a weight percentage maximum, unless specified otherwise.

8 PHYSICAL PROPERTIES**8.1 Apparent Density**

8.1.1 The apparent density for all the grades of powder shall be at least 2.7 g/cm³ but not more than 4.2 g/cm³.

8.1.2 The apparent density shall be determined in accordance with IS 4848.

8.2 Flow Rate

8.2.1 The flow rate shall be as agreed to between the purchaser and the manufacturer.

8.2.2 The flow rate shall be determined in accordance with IS 4840.

9 SAMPLING

The sampling of tin powder for conducting various tests shall be carried out in accordance with IS 6492.

10 PACKING

The powder shall be packed in suitable containers

in quantity mutually agreed to between the purchaser and the manufacturer.

11 MARKING

11.1 Each container of tin powder shall be marked with the following information:

- a) Name and grade of powder;
- b) Batch number and/or date of manufacture;
- c) Net mass of powder in the container; and

- d) Indication of the source of manufacture.

11.2 BIS Certification Marking

The products(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provision of the *Bureau of Indian Standards Act, 2016* and the Rules and Regulations framed thereunder, and the product may be marked with the Standard Mark.

ANNEX A

(Clause 2)

LIST OF REFERRED STANDARDS

<i>IS No.</i>	<i>Title</i>	<i>IS No.</i>	<i>Title</i>
IS 26 : 1992	Tin ingot — Specification (<i>fourth revision</i>)	IS 5432 : 2022/ ISO 3252 : 2019	Powder metallurgy — Vocabulary (<i>second revision</i>)
IS 1387 : 1993	General requirements for the supply of metallurgical materials (<i>second revision</i>)	IS 5644 (Part 2) : 2005/ISO 4491-2 : 1997	Metallic powders — Determination of oxygen content by reduction methods: Part 2 Loss of mass on hydrogen reduction (hydrogen loss) (<i>fourth revision</i>)
IS 1940 : 1969	Methods of chemical analysis of tin ingot (<i>first revision</i>)	IS 5461 : 1984	Method for sieve analysis of metal powders (<i>first revision</i>)
IS 4840 : 2022/ ISO 4490 : 2018	Metallic powders — Determination of flow rate by means of a calibrated funnel (hall flowmeter) (<i>third revision</i>)	IS 6492 : 2020/ ISO 3954 : 2007	Powders for powder metallurgical purposes — Sampling (<i>first revision</i>)
IS 4848 : 2022/ ISO 3923-1 : 2018	Metallic powders — Determination of apparent density — Funnel method (<i>second revision</i>)		

ANNEX B*(Foreword)***COMMITTEE COMPOSITION**

Powder Metallurgical Materials and Products Sectional Committee, MTD 25

<i>Organization</i>	<i>Representative(s)</i>
Indian Institute of Technology Kanpur, Kanpur	DR ANISH UPADHYAY (<i>Chairperson</i>)
Bhabha Atomic Research Centre, Mumbai	PROF AMIT SINHA
Bharat Heavy Electrical Limited, New Delhi	SHRI VIVEK ARYA SHRI BHARAT KUMAR PANT (<i>Alternate</i>)
Controllerate of Quality Assurance, Ichapur	SHRI A. MITRA SHRI T. K. PRUSTY (<i>Alternate</i>)
CSIR – Central Electrochemical Research Institute, Karaikudi	DR DEEPAK KUMAR PATTANAYAK
CSIR – Institute of Minerals & Materials Technology, Bhubaneswar	DR MAYADHAR DEBATA DR PRADYUT SENGUPTA (<i>Alternate</i>)
CSIR – National Metallurgical Laboratory, Jamshedpur	DR V. C. SRIVASTAVA
Defence Institute of Quality Assurance, Bangalore	DR N. KRISHNA MURTHY
Defence Metallurgical Research Laboratory, Ministry of Defence, Hyderabad	DR G. APPA RAO SHRI N. PRABHU (<i>Alternate</i>)
Electronica Tungsten Limited, Malegaon	SHRI BHALCHANDRA V. PATHAK SHRI A. N. CHASKAR (<i>Alternate</i>)
Hoganas India Private Limited, Delhi	SHRI MAHESH NIPANIKAR SHRI SHUBHRANSHU SHEKHAR PANDA (<i>Alternate</i>)
Innomet Advanced Materials Private Limited, Hyderabad	SHRI VINAY CHILAKAPATI
International Advanced Research Centre for Powder Metallurgy & New Materials (ARCI), Hyderabad	DR GURURAJ TELASANG
Kennametal India Limited, Bengaluru	SHRI ALOK BHASKAR SHRI K. CHANDRASHEKAR SHENOY (<i>Alternate I</i>) SHRI SHASHIKUMAR S. (<i>Alternate II</i>)
Ministry of Defence, New Delhi	SHRI A. K. MUKHERJEE SHRI KAUSIK CHAKRABORTY (<i>Alternate</i>)
Mishra Dhatu Nigam Limited, Hyderabad	SHRIMATI U. SAVITHA SHRI BADRI VISHAL PANDEY (<i>Alternate</i>)
Nuclear Fuel Complex, Hyderabad	SHRI JOBIN KOSHY SHRI NIRMOL SANTRA (<i>Alternate</i>)

<i>Organization</i>	<i>Representative(s)</i>
Society of Indian Automobile Manufacturers (SIAM), Delhi	SHRI P. K. BANERJEE SHRI AMIT KUMAR (<i>Alternate</i>)
The Metal Powder Company Limited, Madhurai	SHRI P. SUNDARAPANDIAN
BIS Directorate General	SHRI SANJIV MAINI, SCIENTIST 'F'/ SENIOR DIRECTOR AND HEAD (METALLURGICAL ENGINEERING) [REPRESENTING DIRECTOR GENERAL (<i>Ex-officio</i>)]

Member Secretary
SHRI G. RAM SAI KUMAR
SCIENTIST 'B'/ ASSISTANT DIRECTOR
(METALLURGICAL ENGINEERING), BIS

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Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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